CLAIMS

1. A producing method of a semiconductor device, characterized by comprising:

a step for transferring a plurality of substrates into a processing chamber;

a step for supplying oxygen-containing gas from upstream of said plurality of substrates transferred into said processing chamber;

a step for supplying hydrogen-containing gas from at least one half-way location corresponding to a region where said plurality of substrates transferred into said processing chamber exist;

a step for allowing said oxygen-containing gas and hydrogen-containing gas to react with each other in said processing chamber to oxidize said plurality of substrates; and

a step for transferring said processed substrates out from said processing chamber.

2. A producing method of a semiconductor device as recited in claim 1, characterized in that

in the step for supplying said oxygen-containing gas, said hydrogen-containing gas is also supplied from upstream of said plurality of substrates.

3. A producing method of a semiconductor device as recited in claim 1, characterized in that

in the step for supplying said hydrogen-containing gas, said hydrogen-containing gas is supplied from a plurality of half-way locations corresponding to the region where said plurality of substrates exist.

4. A producing method of a semiconductor device as recited in claim 3, characterized in that

in the step for supplying said hydrogen-containing gas, flow rates of said hydrogen-containing gas supplied from the plurality of locations are different from each other.

5. A producing method of a semiconductor device as recited in claim 4, characterized in that

in the step for supplying said hydrogen-containing gas, a flow rate of said hydrogen-containing gas of the most upstream is the greatest.

6. A producing method of a semiconductor device as recited in claim 1, characterized in that

the step for oxidizing said substrates is carried out in a state in which pressure in said processing chamber is lower

than atmospheric pressure.

7. A producing method of a semiconductor device as recited in claim 1, characterized in that

said oxygen-containing gas is at least one of gases selected from the group consisting of oxygen gas and nitrous oxide gas, and said hydrogen-containing gas is at least one of gases selected from the group consisting of hydrogen gas, ammonia gas and methane gas.

8. A producing method of a semiconductor device as recited in claim 1, characterized in that

said oxygen-containing gas is oxygen gas and said hydrogen-containing gas is hydrogen gas.

9. A producing method of a semiconductor device as recited in claim 1, characterized in that

a surface of said substrate includes different crystal orientation planes, or includes polycrystalline silicon by CVD or silicon nitride.

10. A producing method of a semiconductor device as recited in claim 1, characterized in that

a ratio of a flow rate of said hydrogen-containing gas

to a flow rate of said oxygen-containing gas is 0.1 to 0.5.

11. A producing method of a semiconductor device as recited in claim 2, characterized in that

in the step for supplying said oxygen-containing gas, mixture gas of said oxygen-containing gas and said hydrogen-containing gas mixed outside of said processing chamber is supplied from upstream of said plurality of substrates.

12. A producing method of a semiconductor device as recited in claim 1, characterized in that

said hydrogen-containing gas supplied from said at least one half-way location corresponding to the region where the plurality of substrates exist is supplied toward an inner wall of said processing chamber.

13. A substrate processing apparatus, characterized by comprising:

a processing chamber which processes a plurality of substrates;

a holding tool which holds said plurality of substrates in said processing chamber;

an oxygen-containing gas supply line which supplies

oxygen-containing gas to said plurality of substrates from upstream of said plurality of substrates;

a hydrogen-containing gas supply line which supplies hydrogen-containing gas to said substrates from at least one half-way location corresponding to a region where said plurality of substrates exists; and

an exhaust line which exhaust inside of said processing chamber.

14. A substrate processing apparatus as recited in claim 13, characterized by further comprising a hydrogen-containing gas supply line which supplies said hydrogen-containing gas to said substrates from upstream of said plurality of substrates.

15. A substrate processing apparatus as recited in claim 13, characterized in that

said hydrogen-containing gas supply line comprises a plurality of supply lines which supply said hydrogen-containing gas from a plurality of half-way locations corresponding to the region where the plurality of substrates exist, and said supply lines are disposed independently from each other.

16. A substrate processing apparatus as recited in claim 15, characterized in that

said supply lines respectively have mass flow controllers, and said substrate processing apparatus further comprises a control means which controls such that flow rates of said hydrogen-containing gas supplied from the plurality of supply locations are different from each other.

17. A substrate processing apparatus as recited in claim 15, characterized in that

said supply lines respectively have mass flow controllers, and said substrate processing apparatus further comprises a control means which controls such that flow rate of said hydrogen-containing gas supplied from the most upstream supply line is the greatest.

18. A substrate processing apparatus as recited in claim 13, characterized in that

said substrate processing apparatus further comprises a control means which controls such that pressure in said processing chamber becomes lower than atmospheric pressure.

19. A substrate processing apparatus as recited in claim 13, characterized in that

said oxygen-containing gas is at least one of gases selected from the group consisting of oxygen gas and nitrous

oxide gas, and said hydrogen-containing gas is at least one of gases selected from the group consisting of hydrogen gas, ammonia gas and methane gas.

20. A substrate processing apparatus as recited in claim 13, characterized in that

said oxygen-containing gas is oxygen gas and said hydrogen-containing gas is hydrogen gas.

21. A substrate processing apparatus as recited in claim 13, characterized in that

said hydrogen-containing gas supply line includes a plurality of independent nozzles having different lengths.

22. A substrate processing apparatus as recited in claim 13, characterized in that

said hydrogen-containing gas supply line includes a porous nozzle provided at a side surface thereof with at least two holes.

23. A substrate processing apparatus as recited in claim 14, characterized by further comprising a mixing portion between said processing chamber and said oxygen-containing gas supply line and said hydrogen-containing gas supply line which respectively supply said oxygen-containing gas and said

hydrogen-containing gas to said plurality of substrates from upstream of said substrates, said mixing portion mixing said oxygen-containing gas and said hydrogen-containing gas supplied from said respective lines.

24. A substrate processing apparatus as recited in claim 13, characterized in that

said hydrogen-containing gas supply line which supplies said hydrogen-containing gas to said substrates from said at least one half-way location corresponding to the region where said plurality of substrates exist has a gas jet opening, said gas jet opening is directed toward an inner wall of said processing chamber.